FINAL Functional Requirements Document

California Minimum Essential Datasets (MEDS)

10/2/2009

Michael Baker Jr., Inc.

Baker

Index

1 Project Overview

1.1 Project Objectives

The State of California, through the Office of the State Chief Information Officer (OCIO) and the California Emergency Management Agency (CalEMA) is developing framework data services for a simple set of geographic data known as Minimum Essential Data Sets (MEDS). The MEDS data sets are comprised of three data types 1) Imagery, 2) Transportation and 3) Landmarks. The primary objective of the current phase of the MEDS project is to determine functional requirements for MEDS within the user community and to design an architecture that can satisfy those needs by delivering framework data as Web Services. In addition, a pilot of the data services will be built to provide proof of concept. The full implementation of MEDS will be performed in a subsequent project.

MEDS is intended to support government operations and as such, MEDS users will be government staff at the local, county, regional, state, and federal levels. MEDS will be designed to be delivered in a fashion that makes the common framework data accessible not only to experienced GIS professionals, but also to MEDS users without extensive GIS experience.

This effort is funded by a grant from the US Department of Homeland Security. The map services will allow different jurisdictions to share information and will give decision makers the ability to see a common operating picture, allowing them to better prepare for, respond to, and mitigate disasters. These data services can also serve as the common base for a multitude of other important regular business activities in the state. While the primary project objectives are driven by emergency, disaster and security concerns, compatible uses of the data services in daily business will allow these services to provide continuous value and service to MEDS users.

The State of California intends to use the MEDS project to publish data from best available public sources. MEDS is the first step in providing California's emergency preparatory, response, management, and mitigation staffs with a usable, effective GIS environment. MEDS will also serve as the framework for a Virtual California – a visualization tool that is scalable, maintainable, and capable of leveraging the power of existing and planned GIS applications. Commonly used, easily available landmarks, transportation, and imagery data will provide the context to make other layers of geocoded data meaningful and usable to consumers of varying degrees of technical expertise. Simply put, a collaborative and cohesive California GIS strategy is dependent on the creation of a MEDS standard OGC map service protocol and the subsequent implementation for the state.

1.2 Project Roadmap

In order to achieve the project objectives, a participatory and transparent process was required by the GIO. First, the project team solicited input from stakeholders within the broadly defined community of potential MEDS users through an online survey and a series of Requirements Interviews meetings. This community was comprised primarily of local, county, regional, state and federal agencies, including both emergency operations staff and traditional GIS staff. Secondly, the

project team refined the focus of the MEDS project by seeking clear priorities from the MEDS Steering Committee.

The current task, creation of a Draft Functional Requirements Document, is the culmination of these activities. The Draft Functional Requirements Document seeks to describe the elementary functional needs of the MEDS users based on the inputs from the community, the Steering Committee, the primary stakeholder (Cal EMA) and the project sponsor (Geographic Information Officer). The clear identification of basic functionality required of the project will drive the Design Specification and ultimately the Architectural Design Document. This Functional Requirements Document will identify WHAT functionality is required for MEDS, but not HOW that functionality will be implemented, nor any specific technological solutions. The HOW will be presented in the Design Specification and the specific technological solutions will be detailed in the Architectural Design Document.

2 Project Approach

2.1 Clear Project Objectives

One thing was very clear from the Requirements meetings – there are numerous unmet needs and diverse requirements in the stakeholder GIS community and a wide range of stakeholder missions and business needs. It is critical to the success of this phase of MEDS to retain sharp focus on the ***immediate, achievable and beneficial objectives*** that will lay the foundations for broader subsequent initiatives.

2.2 Engagement of Stakeholders and Project Transparency

It is essential in the discovery of functional requirements to engage the stakeholders in an exploration of their needs. To accomplish this engagement the MEDS project held four Requirements Interviews meetings throughout California. Prior to the Requirements Interview meetings, stakeholders were asked to complete an online survey that sought to capture a snapshot of user needs. Pre-meeting survey results are presented in Appendix 15.1.1. These results served not only as a useful preview of stakeholder needs and profiles, but also presented a baseline of data which could be elaborated on and explored in more detail during the meetings. Response to the survey was good, with 101 stakeholders participating in the online surveys.

The largest group of respondents participating in the survey were County and City representatives (25 counties and 15 cities). There was also significant response from numerous associations of governments (SACOG, SANDAG, AMBAG, and BCAG), and from federal and state agencies (CalEMA, DHS, USDA, USBR, USFWS, etc.). The respondents' backgrounds ranged from traditional GIS to emergency management services, engineering, transportation, conservation, research, flood, fire and homeland security.

The Requirements Interview meetings were held in the four venues shown in the table.

Venue	Location	Date	Number of Attendees
Sacramento Emergency Operations Center	McClellan, CA	August 11, 2009	46
San Diego Super Computer	La Jolla, CA	August 12, 2009	19
NASA/Ames Research Center	Moffett Field, CA	August 18, 2009	29
Los Angeles County Chief Information Office	Los Angeles, CA	August 20, 2009	27
		TOTAL	**121**

Each of the meetings had its own flavor, based in part on the varying agencies and missions of those attending and in part on regional differences. Discussion was free-ranging and many great ideas were discussed. A high-level summary of the most salient points from the four meetings is presented in list form in Appendix 15.1.2. The participants in the meetings raised many good points and there was extensive discussion both on what should form the relevant data for MEDS and on what technologies were being used or contemplated in the California geospatial community.

2.3 Project Steering Committee

The Geographic Information Officer (GIO) has assembled a Steering Committee of stakeholders to assist in setting project priorities and making decisions relevant to the project direction. The members of this committee are as follows:

Mike Byrne, GISP	GIO & Project Sponsor
Scott Paterson, PMP	California OCIO Project Manager
Diane Vaughan CalEMA	Steering Committee Member and Primary Stakeholder
Gary Darling, GISP OCIO	Steering Committee Member
Carol Ostergren CAUSGS Liaison	Steering Committee Member
Coco Briseno Caltrans	Steering Committee Member
Joe Concannon Sacramento Area Council of Governments	Steering Committee Member
Terrence Newsome, CalEMA	Steering Committee Member
David Harris Natural Resources	Steering Committee Member

2.4 Pragmatic and Focusing on Achievable Goals

Following the Requirements Interview meetings, the project team met with the Steering Committee on September 14, 2009 to review results from the meetings and to establish functional requirement priorities. This process by necessity followed the concept of focusing on core, critical data and functionality. The Baker project team received clear prioritization of functional needs from the Steering Committee. This prioritization focuses on addressing basic functionalities that are of most direct and immediate benefit to the user community and can be described most simply as: **access to the best available public data for the MEDS through a robust and scalable system**. Some of the data or functionalities identified as lower priority by the Steering Committee are nonetheless quite valid and useful, but simply are not slated for implementation in the initial rollout of MEDS. Many of these lower priorities could well be implemented in subsequent budget years.

The participation in the Requirements Interview meetings described above ensures that stakeholders have a strong voice in MEDS and that the project has clear endorsement from the participating agencies. The identification of priorities by the Steering Committee ensures that the project focuses on those datasets and functionalities most central to designing a MEDS project that not only fills immediate needs, but that also forms a solid foundation on which to build.

3 Data Requirements

It was apparent from the pre-workshops survey results and the Requirement Interview meetings that the GIS data needs are diverse across the State of California. The availability of data to support a statewide Minimum Essential Datasets (MEDS) is different for each MEDS category. The nature and level of existing data for each of the categories varies from one source to another. In deciding which data will form MEDS, the project management team and the Steering Committee agreed that the appropriate starting data base for each of the three categories (imagery, landmarks and transportation) is the best readily available statewide coverage source. These seamless statewide sources can then be supplemented by better publicly available data at the local scale, where available.

MEDS will serve several essential functions strictly in the storage and serving of data. First, it will allow users at all levels of government to easily access a common dataset. Secondly, it will allow local or regional jurisdictions to readily access data for adjacent jurisdictions. Thirdly, it will serve as a backup repository for local governments – a failsafe in case their own local data center is rendered inoperable during an event.

3.1 Landmarks

Landmarks presented the greatest diversity of opinion during the stakeholder meetings. It was quite clear during the lengthy discussions of this topic that there is great divergence in the definition and use of landmarks within government agencies. Two factors largely drive this divergence – scale and agency mission. Perhaps the closest area of agreement within landmarks was the use of landmarks as a navigation indicator, i.e., recognizable structures or landscape

features that would enable staff to navigate in the aftermath of an event. Many other features, including infrastructure of nearly every type were mentioned in the discussions.

When brought to the Steering Committee; however, the decision was to follow two paths in building a landmark service. Two datasets will form the foundation of landmarks; Geographic Names Information System (GNIS) from the USGS will provide landmarks state-wide and address points from local government assessors' offices will provide denser information at a finer, local scale.

3.2 Transportation

Transportation is a large data domain, potentially including all forms of transport across land, sea and sky. There was significant discussion of the many potential characteristics of transportation data, including both permanent travel restrictions such as bridge clearances or weight limits and more transitory barriers such as weather or debris-based street closures. One significant point of discovery during the meetings was that local dispatch centers rely on their own in-house data for routing of emergency vehicles and were unanimous in their opinions that their local data was best suited to their local needs. The project team concluded that MEDS transportation would not replace local data for these specialized routing needs.

The Steering Committee determined that TIGER street centerlines will be the statewide foundation for MEDS transportation data. TIGER centerlines will be supplemented with local street centerline data from counties, where available. Routing functionality will not be an initial feature of the MEDS transportation dataset. The MEDS transportation datasets will be stored and served as separate layers; one statewide data layer (TIGER) and additional layers for county transportation datasets, i.e. not as a seamless network. The ultimate goal is to serve a seamless street centerline network, but the availability of such a sustainable transportation layer for California is tied to other ongoing efforts for stewarding transportation centerlines on a state level.

3.3 Imagery

Imagery was a relatively straight-forward dataset when compared to the vector datasets. Primary concerns surrounding imagery are the size of the images, the bandwidth available to retrieve it, the currency and resolution, and in some cases the local expertise to load it.

The Steering Committee's decision was that the starting point for statewide best available imagery will be the color, 1-meter resolution orthophotos from the 2009 National Agriculture Imagery Program (NAIP). The USGS has agreed to provide the required imagery to the MEDS project. NAIP will be the base, seamless, statewide imagery layer and will be supplemented by high resolution urban footprint (1 foot or better), where available. Imagery datasets will be stored and served as separate layers; a single, static mosaic imagery layer will not be created.

Depending on their specific needs, MEDS users may access either a single, consistent snapshot in time or the highest available resolution for a given area. To meet this requirement to access a variably-defined "best available imagery", MEDS will include technologies/solutions that enable on-

the-fly mosaicing and on-demand on/off toggling of imagery overlays. This approach also reduces maintenance costs associated with continually updating mosaic layers as new imagery is acquired.

While there exists some desire within the stakeholder community to build an online catalog of all available historical imagery, the initial implementation of MEDS will be restricted to the most recent NAIP plus the most recent high resolution urban footprint.

4 Data Service Requirements

MEDS data services shall be reliable. Considering that bandwidth and internet connectivity may be an issue during emergency situations, access to MEDS data shall be available through multiple options, including Web Services, FTP/HTTP transmission and Sneakernet. This fail-over strategy provides for access to MEDS data in worst case scenarios.

The stakeholder meetings clearly identified the requirement for local storage of the MEDS data, in addition to the data availability via the Web Services.

4.1 Data Service via Web Services

Stakeholder meetings and pre-meeting survey results clearly showed that the user community has been both pushing their data and consuming data from other sources via Web Services. MEDS data distribution shall have an option to be consumed as Web Services.

User community prefers to consume the Landmark and Transportation data as Web Feature Services (WFS) and the Imagery data as Web Map Services (WMS). Consumption of the vector data as WFS will allow a greater range of functionality and access to attributes.

4.2 Data Distribution via FTP/HTTP

MEDS data shall have an option to be distributed via FTP/HTTP for easy access (i.e. MEDS users able to download data). MEDS shall have a well-organized and documented directory structure for MEDS users to decide what to download and estimated download time.

MEDS shall have mirror FTP/HTTP download sites for Fail-Safe and load balancing reasons.

Email attachment of MEDS data shall not be part of the data distribution service due to the reliability concern and inconsistent maximum file size allowed by different email servers.

4.3 Data Service via Sneakernet

MEDS data shall have a method to be distributed via Sneakernet since users require having a local copy of the data. This is especially true for the image data. Stakeholder meetings demonstrated the strong preference for external hard drives such as USB drives.

MEDS data Sneaker Net distribution shall be convenient to the user community so users can obtain the data quickly.

4.4 Data Service to Non-Professional GIS Tools

Stakeholder meetings and pre-meeting survey results demonstrated the need to display MEDS data on non-professional map and globe visualization GIS tools such as Google Earth. To meet the requirement of serving a wide range of MEDS users it is clear that MEDS must be easily accessed not only from within full-blown professional GIS tools, but also by light-weight map viewing applications taking advantage of standard APIs. MEDS shall have the capability to provide data in formats such as GML that can be consumed by those tools.

5 Data Services Application Requirements

5.1 Data Synchronization and Replication

MEDS shall focus on hosting the existing best available data from authoritative sources. Periodic data updates to the MEDS shall be performed once the data stewards have updates. Two–way data synchronization and replication shall be considered in the future phases.

5.2 Data Change Notification

The MEDS shall notify user community whenever a data update is performed. The details of the changes shall be included in the notification.

The notification methods shall include web page announcement, automated email, and RSS feeds.

MEDS solution shall also have a mechanism for the data stakeholders to notify the MEDS steward (OCIO) of data updates.

5.3 Data Catalog Service

MEDS shall have a catalog service that provides a single source of data discovery. Users shall be able to use it to explore what MEDS offers and detailed metadata of each dataset. This data catalog service shall be web based.

5.4 Web 2.0 APIs to Serve MEDS Imagery

Stakeholder meetings demonstrated the need to publish MEDS images on top of popular consumer oriented mapping engines such as Google Maps and Bing Maps. A tool shall be developed to create a set of image tiles that can be readily available to overlay on map and globe visualization tools such as Google Maps and Bing Maps.

The pre-cached tiles shall be stored and made available via multiple hosting sites.

6 Usability

Stakeholder meetings expressed the consensus that the data service and any applications utilizing those data in MEDS shall be easy to use for a MEDS user.

6.1 Training Material

The MEDS solution shall have Web, MS PowerPoint, and PDF versions of training materials on how to use any applications (including Web Services) provided through MEDS.

6.2 Documentation and On-line Help

The MEDS shall provide documentation about the data it provides, including FGDC compliant metadata.

Online help shall be provided for any applications developed to interact with MEDS data.

7 Reliability

The reliability requirement shall break into two different levels: Normal daily operation and emergency operations. During normal daily operations, MEDS data and application reliability does not have to have 100% availability. During emergency operations the data access shall be guaranteed and Web Services shall be used only in non-mission critical situations unless the reliability can be guaranteed. This reliability need during emergency operations drives the user community to require local data access.

For any online data and application services, high reliability always comes with high bandwidth and infrastructure cost (servers, network, storage, software, loading balancing). During the MEDS solution design stage, the balance between cost and reliability shall be addressed.

7.1 Maximum Down Time

The stakeholder meetings and pre-meeting survey demonstrated the needs for the MEDS FTP/HTTP download and Web Services (WMS and WFS) to be 24/7. This requirement, if translated into 100% system Up Time, would prove to be too costly and not practical. Any proposed solutions shall attempt to minimize the Down Time such as using mirrored data hosting sites.

MEDS shall be a protected environment for government access only, including local, county, regional, state and federal. This restriction shall lessen the pressure of concurrent users.

The Sneakernet deliverable method shall be guaranteed at all times.

7.2 Ease of Recovery

MEDS data storage and applications shall be backed up after any data and/or application update. The MEDS data access shall be restored quickly in case of catastrophic failure. Specific restoration time targets will depend on hosting data center capabilities and will have cost implications.

8 Scalability Requirements

The stakeholder meetings and pre-meeting survey demonstrated the needs for the MEDS FTP/HTTP download and Web Services (WMS and WFS) to be able to scale up to handle peak demands during an emergency. No concurrent user requirement was clearly defined for either

data download or Web Services. Any proposed solution in MEDS data Web Services (WMS and WFS) shall consider the scalability concerns. It is understandable that the cost for scaling up could be prohibitive, so the MEDS solution shall clearly document its scalability parameters.

9 Performance

For data FTP/HTTP download, the data upstream speed shall be at least T1. For Sneakernet delivery, the device shall have at least USB 2.0 speed. Any Web Services provided via MEDS shall have at least T1 upstream.

10 Security

The targeted MEDS users are all government agencies. There shall be a mechanism to ensure that only approved government agencies can access to both data and Web Services.

11 Supportability

Initially contractors shall develop the MEDS database and set up the WMS and WFS under the OCIO office's directives. The long term goal is that GIO staff can perform routine support duties.

11.1 Ease of Installation

The MEDS data storage and associated WMS and WFS shall be easy enough for a trained GIS professional to install.

11.2 Planned Maintenance

The MEDS data storage and associated WMS and WFS shall be easy enough for a trained GIS professional to perform normal database and system maintenance.

12 Infrastructure Requirements

12.1 Clients

The consumption of MEDS data and associated Web Service shall not impose significant software and hardware upgrades for MEDS users since mainstream GIS tools have built-in functions to support the consumption of standard-based (such as OGC) Web Services. The file-based MEDS deliverables shall be in popular GIS and mapping formats so no additional investment shall be required by the MEDS users for data conversion.

12.2 Servers

The application servers shall be able to meet the concurrent user requirements. At least two mirror sites shall be available for the FTP/HTTP file download.

12.3 Networks

The MEDS data storage and Web Services shall reside on 1000 mbps network at minimum.

13 Implementation Constraints

The technologies to be used for MEDS data storage and Web Services shall consider the existing investment of technologies and staff training of the data stewards and user community. Stakeholder meetings and pre-meeting survey results shows that data development and storage is predominately ESRI-centric. Data publication and consumption via Web Services is also predominately through ESRI technology. The existence of this constraint does not preclude any specific technologies, but is simply a factor that must be taken into consideration.

Internet bandwidth is also an issue with some rural counties. Large dataset and file download can be slow and unreliable in these areas.

13.1 Languages

The MEDS data and application shall be English only.

13.2 Operating Systems

User community is predominately Windows based. This is based on the pre-stakeholder meeting survey result.

13.3 System Interfaces

MEDS shall publish its services to the consumer application clients using OGC compliant web services. Any spatial data related interface shall be OGC compliant.

14 Glossary

Term	Definition
API	Application Programming Interface
FTP	File Transfer Protocol
GIO	Geographic Information Officer
HTTP	Hyper Text Transfer Protocol
OCIO	Office of Chief Information Officer
OGC	Open GIS Consortium
Sneakernet	The transfer of electronic information, especially computer files, by physically carrying removable media such as magnetic tape, floppy disks, compact discs, USB flash drives, or external hard drives from one computer to another
WFS	Web Feature Service
WMS	Web Map Service

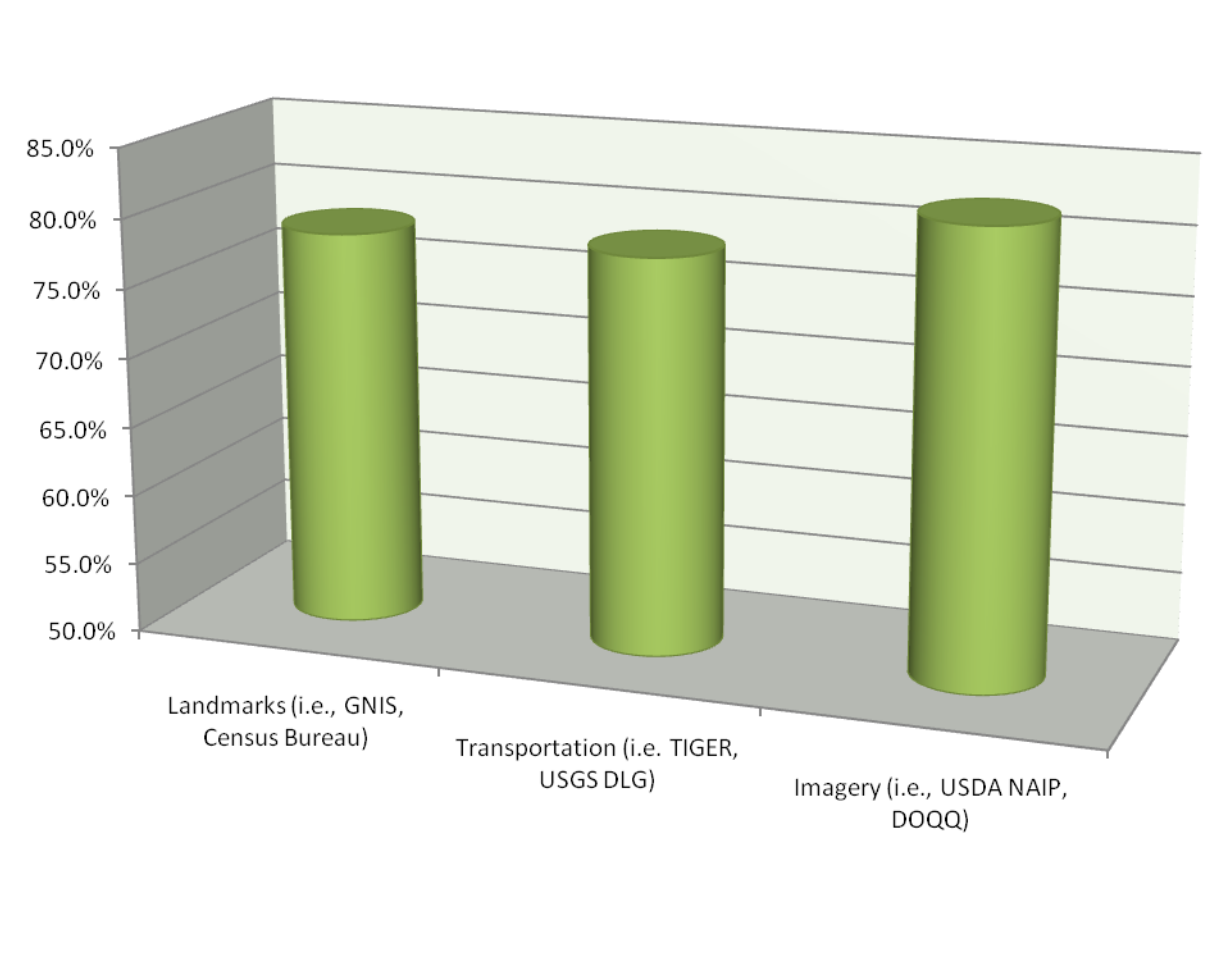
15 APPENDICES

15.1.1 Pre-Workshop Survey Results

The pre-workshop survey consisted of 25 questions. The survey was made available online to extensive lists of government staff submitted by the MEDS Steering Committee. Responses were received from 101 participants between July 20th and August 20th, 2009. Questions which dealt solely with contact information or which were not applicable creation of the Draft Functional Requirements Document are not presented.

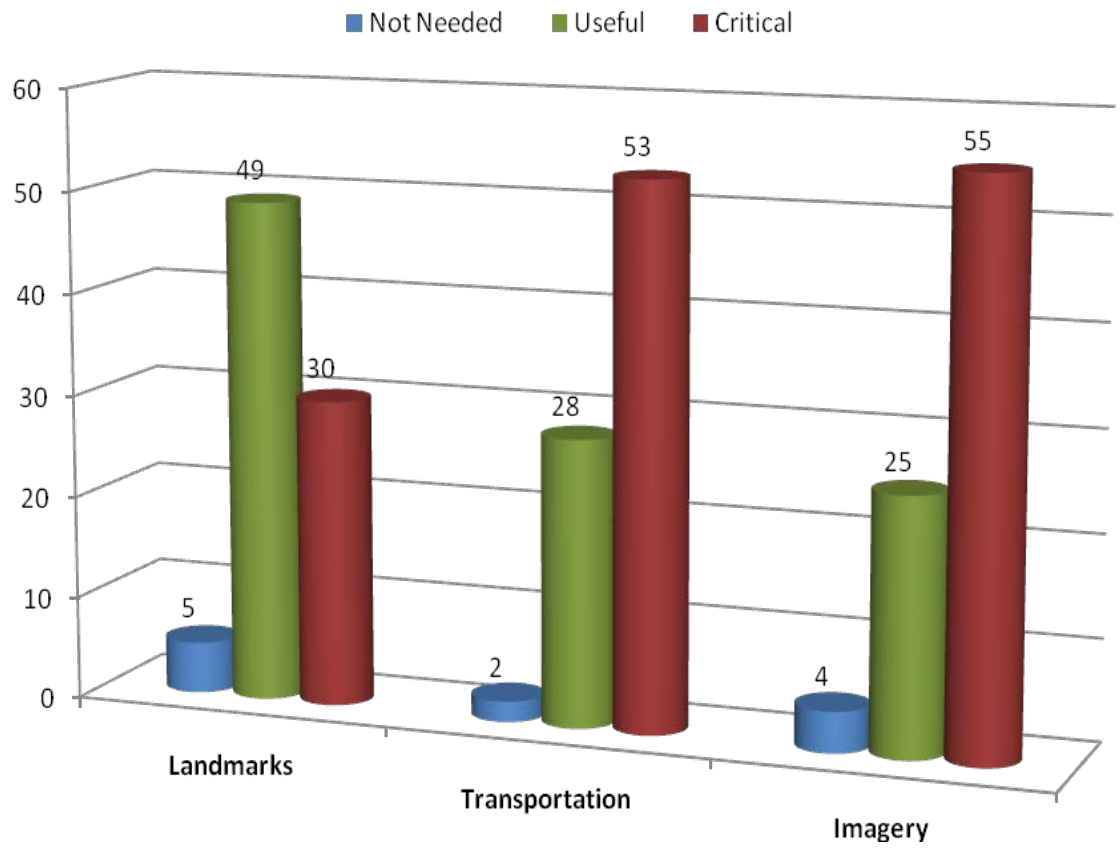
Question 4:

Does your organization use data from other organizations in the following datasets?

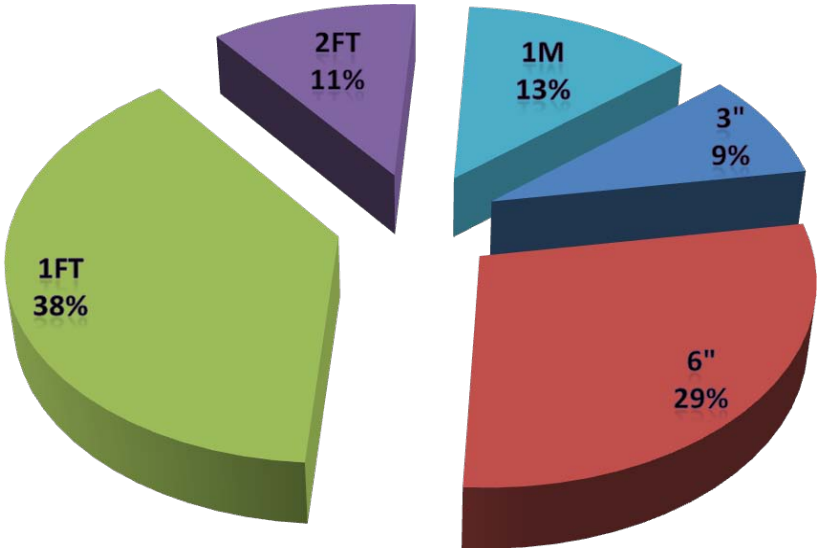


Question 5:

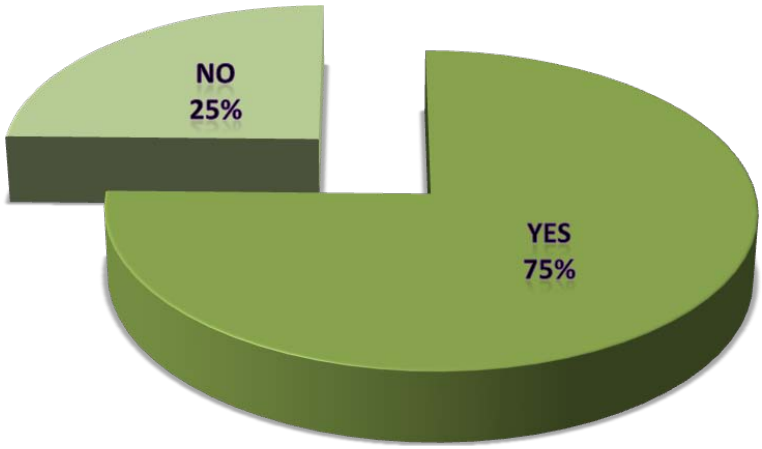
How essential to your business operation is access to metadata when consuming or visualizing the following datasets?



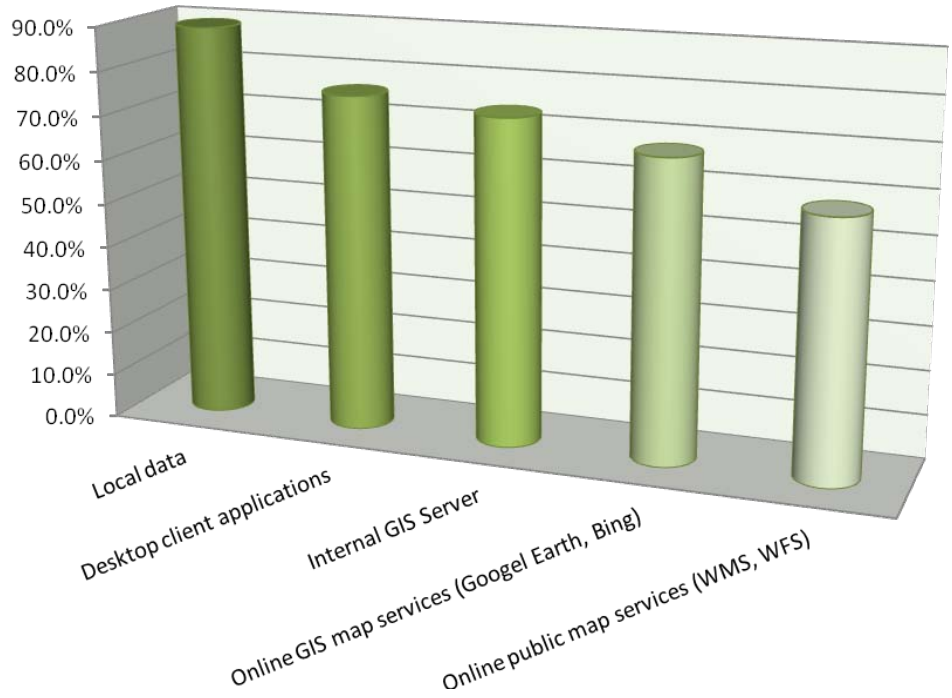
Question 6:
What is the optimal resolution for orthoimagery needed for your business operations?



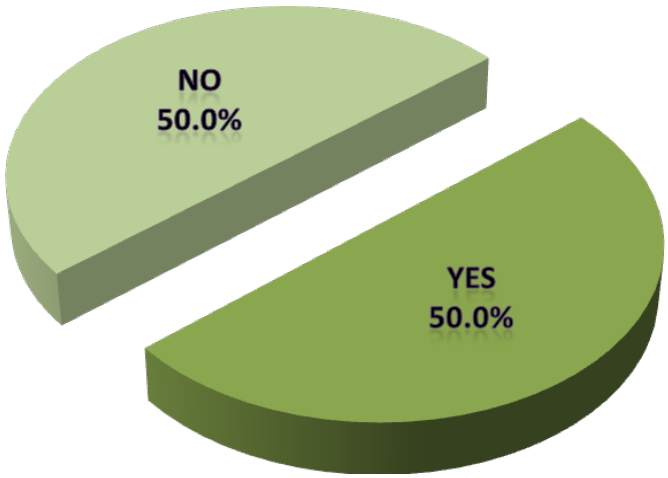
Question 7:
Do you need access to historical orthoimagery for your business operations?



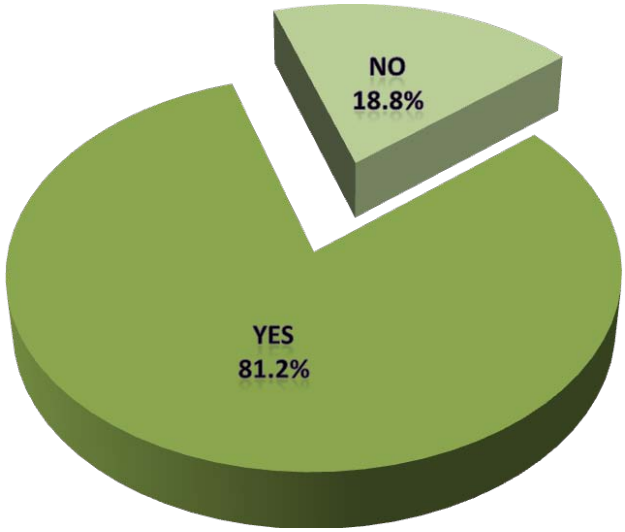
Question 8:
How do you currently access/consume raster and vector datasets? (Check all that apply)



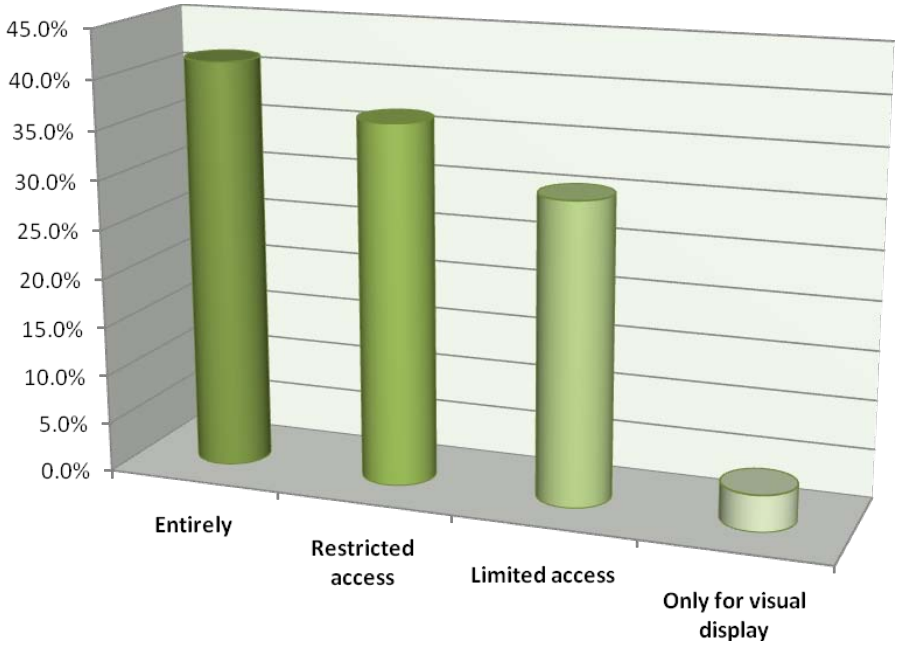
Question 9:
Is your organization a supplier of spatial datasets to Federal and other state agencies?



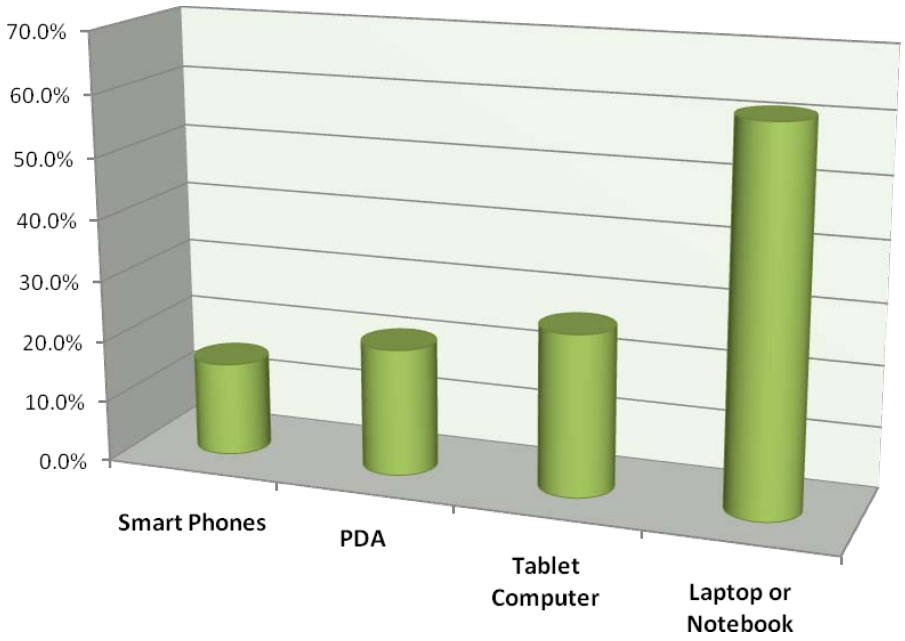
Question 10:
Does your organization create/maintain metadata for its own spatial datasets?



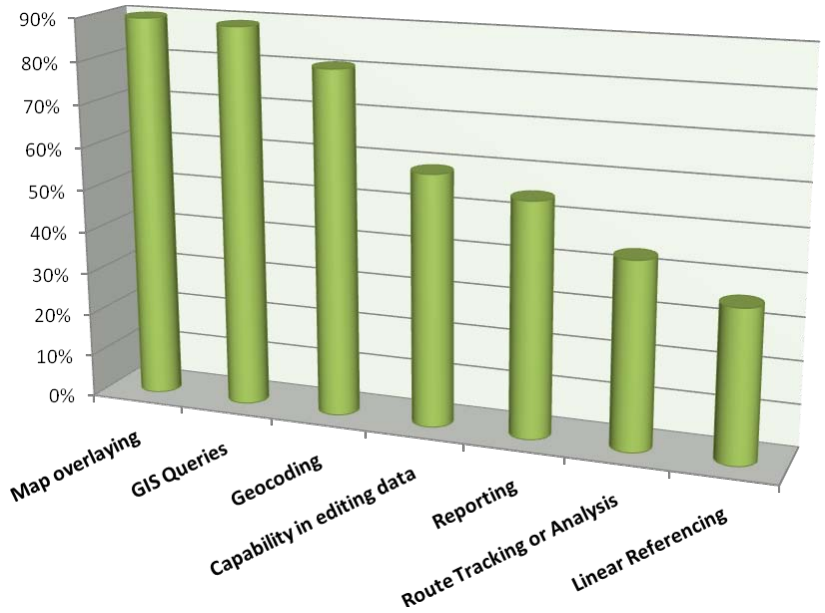
Question 11:
Is your organization willing to share its data with other government agencies?



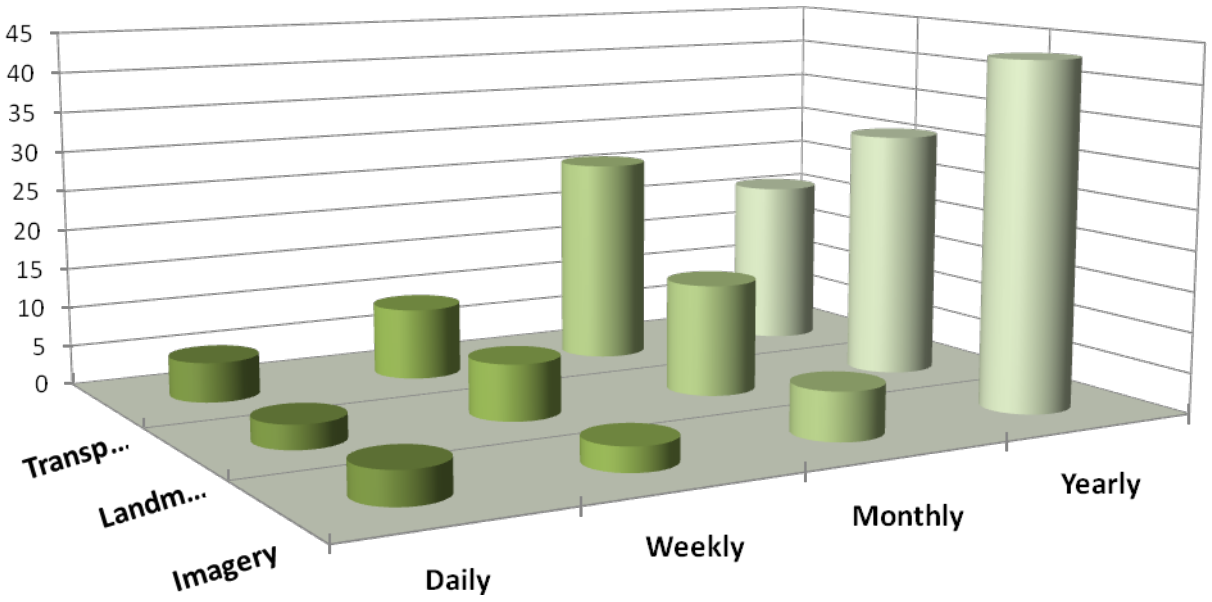
Question 16:
Do your operations require access to mapping services from field/mobile computers?



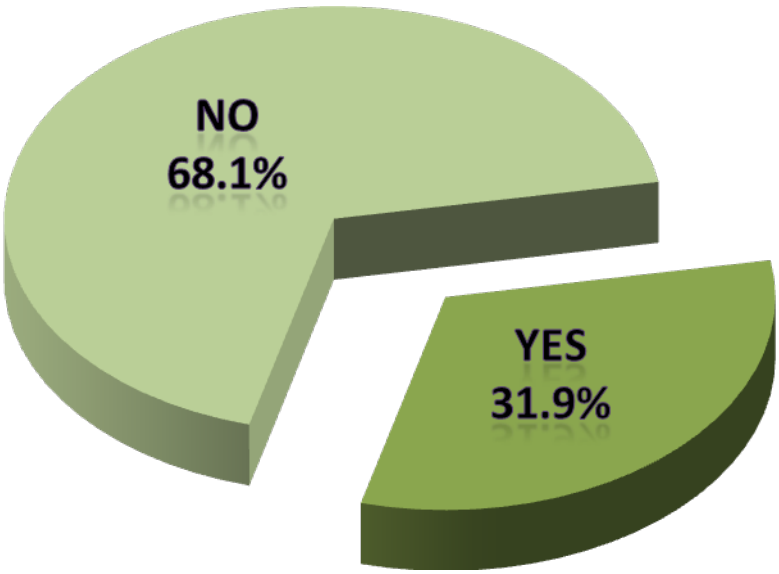
Question 17:
What types of GIS and Mapping functions are needed in your operations when visualizing MEDS?



Question 18:
How often do you update spatial data that is critical to your operations?



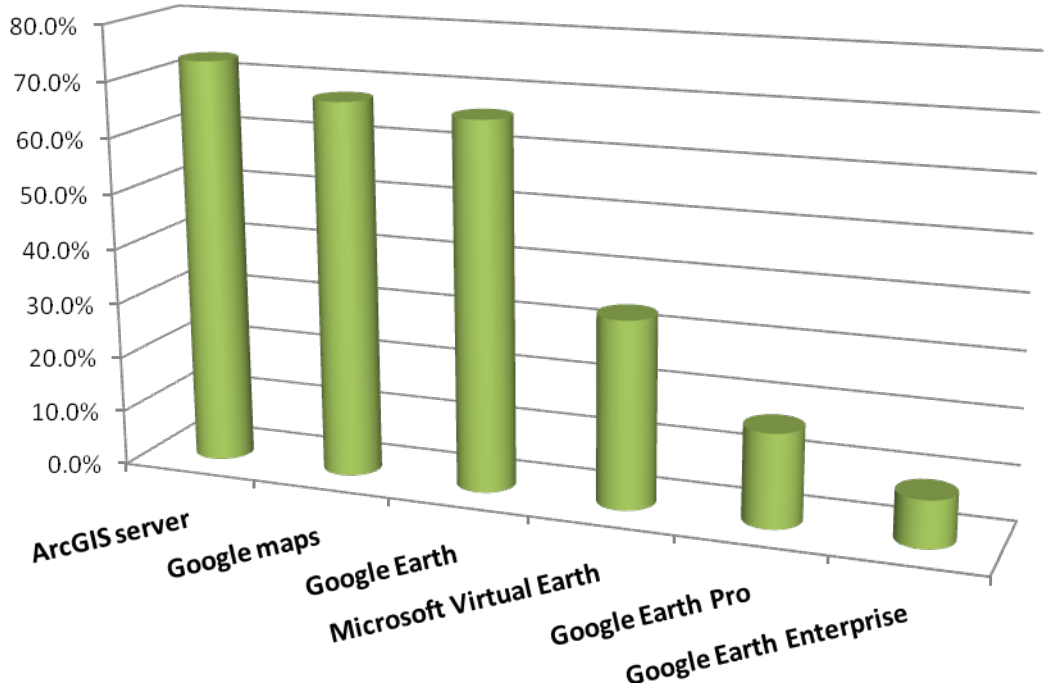
Question 19:
Do you need to synchronize in real time field data collection with an online map service?



Question 20:
If you currently provide spatial data online:

	Response		
	Min	**Max**	**Mode**
How many concurrent users do you support?	**3**	**400**	**20**
How many concurrent users would you like to support?	**10**	**1,500**	**100**

Question 21:
Do you currently use any of the following GIS and mapping technologies?

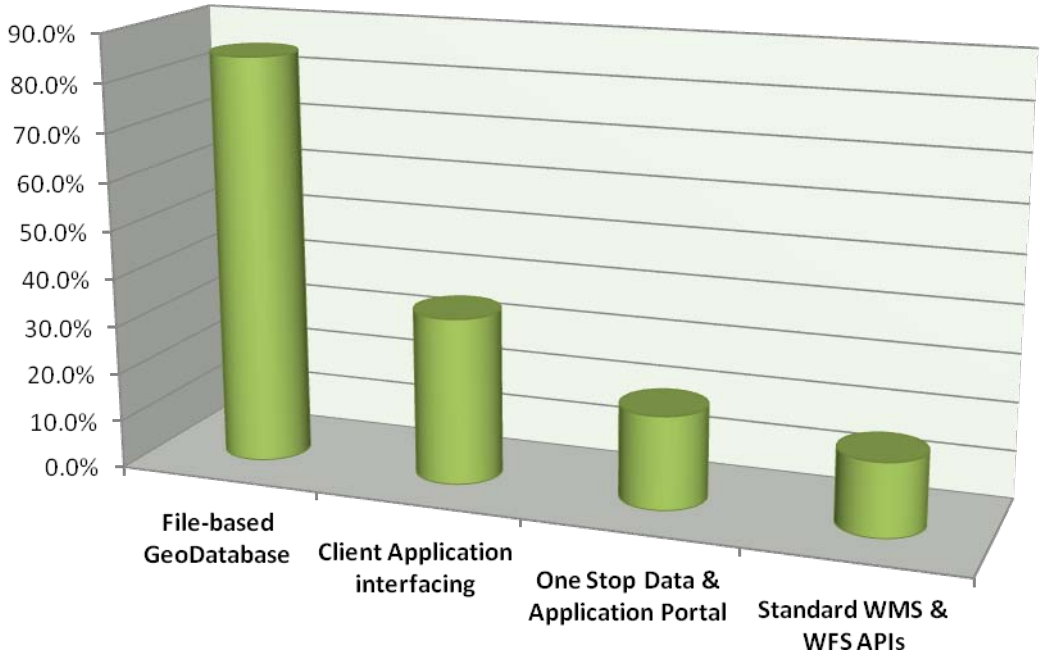


Question 22:
Do you currently use Cloud Computing? (check all that apply)
(Note extremely low response rate for this question.)

Answer Options	**Response Percent**	**Response Count**
File Storage	40.0%	4
Database storage	40.0%	4
Spatial data storage	60.0%	6

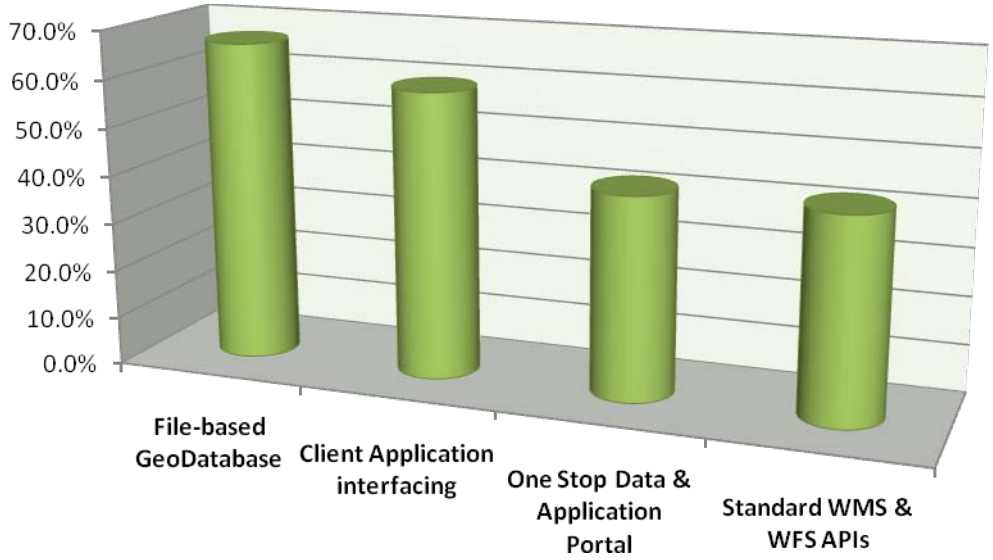
Question 23

How do you currently provide data to users?



Question 24

How do you envision consuming the MEDS?



15.1.2 Requirements Interview Meetings High-level Summary

MEDS Requirements Meetings
High-Level Summary
Steering Committee Meeting, Sept 14, 2009

Landmarks

- No agreement on overall definition.
- Fairly commonly thought of as "landmarks for navigation/reference". Landmark may not be a physical structure such as a building. It could be anything that could be used for location reference and navigation such as road intersections.
- Scale and agency mission both influence what is thought of as a landmark.
- GNIS as a base, with mechanism for locals to supplement.
- Identified emergency dispatch center information as a source of meaningful local landmarks.
- Homeland Security 18 Sectors
- Sensitivity Tiers: 1 & 2 Secret, 3 Government, 4 State. Sensitivity is not related to basic information about the landmarks/locations but to the risks associated with landmarks.
- Focus on types of maps required by incident commanders and less on data.
- Not going to get people at a business; not going to get accidents along a freeway
- Landmark a bucket to capture non-transport or non-imagery feedback
- Landmarks may be event related and temporary: evacuation locations, shelters, etc.

Transportation

- Street centerlines (obviously) are most common need.
- Not addresses; it is about conveyance
- Bridge and street barrier info is important (daily, weekly, seasonal/planned vs temporary vs emergency)
- Private roads, evacuation routes
- Overpass, underpass and clearance info
- How do we get people out and equipment in
- Transportation asset data such as signs, guiderails, ramps, inlets.
- Entire transportation universe (mass transit, water transport) is important
- Rail; lots of trains; if they break it causes movement of people/vehicles problems
- Mileposts from Caltrans may be valuable addition to local data.
- Geocoding is important; 50% use their own geocoding (Commercial cited as not accurate)
- Routing is of importance to some users.
- Local datasets are thought to be of highest quality. Need to be good enough to direct emergency responses such as which route has height clearance for fire engines, and which routes allow a fire engine to turn.
- Dispatch centers will be using their own data. Rarely, if any, use public data via open engines such as Google Maps and Bing Maps.

Baker
Page 1 of 3

MEDS Requirements Meetings
High-Level Summary
Steering Committee Meeting, Sept 14, 2009

Imagery

- Ever increasing accuracy and frequency drives users expectations
- Pipe capacity is thought to be an issue due to raster size.
- Local expertise with image loading and use may be an issue.
- Many possible image datasets, but some agreement that color, 1' imagery serves most needs.
- Post-disaster imagery is a different type of beast and some data QUICK may be better than a lot of data LATER.
- Need frequent image updates during an event. Many have established means in securing and using images during an event (contractors providing the services during an event).
- Most recent pre and post event, plus time sequence
- Low-res to start; hi-res later
- Rapid ingestion
- Long duration events cause data overload
- Preprocess vast inputs and huge imagery datasets into one lightweight imagery
- Natural color / multi-spectral. Multi-spectral imagery need is very limited.
- CalEMA has 1 meter; need better just prior and immediately post; time sequences of interest
- Imagery frequently by collaborative; if provided free to MEDS why would members stay in consortium?
- Concept of designating a 'best available imagery" provider for specific geographies.
- Technologies available to "see" through clouds (i.e., radar and infra-red for fires).

Data & Sharing Data

- Need ability to see across boundaries to perform queries and analysis
- If the data is readily available it will be used and user demand will necessitate it improves
- Data is continually updated; it can be a burden to share
- Will share if there is a mandate and it is easy to do so
- Access level control will improve data sharing
- Standard projections and units
- State overcome DMZ; information from a trusted source
- Authorative or trusted source is good; if data is too old then it is not as useful
- Capture information to see temporal changes
- Make data useful back to locals
- Go minimal; we can't solve all problems
- If data is from local; how will it come back to local; how will it be maintained?
- Focus funds on landmarks not on war-room imagery
- There are administrative barriers to pulling data from locals

Baker
Page 2 of 3

MEDS Requirements Meetings
High-Level Summary
Steering Committee Meeting, Sept 14, 2009

Metadata

- Numbers in metadata must have associated units
- Metadata is very important when using someone else's data. Minimum essential such as projection, source and dates are a must.
- Maintaining metadata that meets standards for sharing data may be an inconvenience and hamper the will to release the data.

Technology

- Security not an issue with Framework data; critical during an emergency
- MEDS for all (Government agencies)
- Reality is desktop; desired is WMS
- Strong desire to download data to local hardware (current state; workaround due to current state?)
- Some are building WMS for clients; tools to view for non-clients
- Preview content; then download
- View / Analyze / Model; implies capability to ingest and query geodatabases.
- Driven by a workflow; intake, validate (near real time), distribute to all (state, federal, and return to local)
- Reliable; easily refreshed especially during emergencies
- Get a lot of data out for use then focus on policy
- Landmarks and transportation as shapefiles; imagery as WMS.
- Failover to lower bandwidth solutions should be examined.
- Significant ESRI technology and staff available.
- No strong technology solution preferences.
- Uptime is critical 24/7.
- Comfortable to use Web Services especially WMS for publishing and consuming spatial data.
- Limited exposure to and use of Open Source datasets and mapping technologies
- MEDS useful if one area goes down, external agencies will still have access to data for that area.
- Mobile impacted by low/no signal in rural areas
- Smartphone usage not currently in place; maybe for future.
- Provide awareness and training to move us into mobile/smartphone use

Baker
Page 3 of 3

15.1.3 Functionality Matrix

The documents in this section represent working documents used in the September 14, 2009 Steering Committee to focus discussion on prioritization of the MEDS data and functions. Cells in the spreadsheets are color-coded based on Steering Committee direction; green for requirement, yellow for possible requirement for future phase of MEDS, red for not a requirement. These documents are included for informational purposes only and while generally reliable, do not represent all the points of discussion during the Steering Committee meeting.

Data Services: Provides access to spatial content in repositories and databases and allow data processing through common interfaces			
Requirements	**Landmarks**	**Transportation**	**Imagery**
Reliability	24/7 reliability.	24/7 reliability.	24/7 reliability.
Supercomputer centers high-reliability. Infrastructure not yet defined, so up-time not yet quantifiable.			
Scalability	Need to scale up with more data and also allow heavy data hits.	Need to scale up with more data and also allow heavy data hits.	Need to scale up with more data and also allow heavy data hits.
Performance	High performance during spikes.	High performance during spikes.	High performance during spikes.
Single Point access via portal	Not required.	Not required.	Not required.
Central and reliable repository	Yes	Yes	Yes
Technology options			
Data centers with fail-safe (NASA and AMS)	CALEMA	CALTRANS	X
MEDS Rapid Deployment Kits (Single or multiple external hard disks with data viewer, MXD files, how-to manual)	X	X	X
Data as Web Map Services	WFS	WFS	X

Catalog Services: Collection, registration and maintenance of descriptive information and database			
Requirements	**Landmarks**	**Transportation**	**Imagery (non event)**
Definitions	Diversified data definition. Scale and agency mission both influence what is thought of as a landmark.	Road centerline network is the consensus.	NAIP plus urban footprint.
	In emergency situation, easily recognizable natural or man made features, i.e., "landmarks for navigation/reference".	Assets and choke points such as bridges and lane closures can also be important.	Some interest in some cases remote sensing grade.
	Features useful for planning, responding and post event activities.	Local Data is Best Available. TIGER data not accurate enough for local use. (At some point TIGER, supplemented w/local is the endpoint).	Post-disaster imagery is a different type of beast and some data QUICK may be better than a lot of data LATER.
	Initial focus on GNIS as a common base to build on. Situs.	Mileposts from Caltrans could be valuable.	Ultimately a historical archive.
My data needs	Features that can be used in local emergency response	Local 911 and emergency response systems will always rely on their own local data. CAD is outside and there is no routing.	Need to easily and quickly load large images taken during the emergency and post emergency. Historic images can be useful for analysis
	Must have a local copy	Must have local copy. Cloud services via open engines not accurate and reliable enough	Must have local copy, or at least on external HD. Lack of local expertise can be an issue w/loading data. KEY CONTACT LIST.
	Desire to have data in adjacent area	Desire to have data in adjacent area for cross border connectivity	Desire to have a collective bargaining powers with image services.
Data push	e-Delivery: FTP, HTTP download, Gforge -app open source (like FTP)	e-Delivery: FTP, HTTP download, Gforge -app open source (like FTP)	e-Delivery: email, FTP, HTTP download, disk delivery. Disk delivery is more practical.
	email ,disk delivery	email ,disk delivery	
	Data notification	Data notification	
Data pull	Data/file loading,	Network data in files, and some data such as closures can be consumed via Web Services	Critical images load as files (and also pyramided if in Arc format) from a centralized place. Pull data in as files on external HD.
	Web Service consumption		GEOPDF OR GEOTIFF?
Data discovery	authoritative sources	authoritative sources - counties	authoritative sources
Centralized/federated data storage	Centralized at local level (i.e., county emergency management wants their data centralized at the county level). Centralized repository.	Centralized at local level (i.e., county emergency management wants their data centralized at the county level). Centralized repository.	CENTRALIZED AT STATE.
Metadata	Critical in data sharing. Data owner needs to be able to control the interpretation of data.	Critical in data sharing. Data owner needs to be able to control the interpretation of data.	Critical in data sharing especially the technical specs. Data owner needs to be able to control the interpretation of data.
Fail Safe/Redundancy	Yes. Need two-tiered system, w/data available both via internet and locally, so if internet goes down users still have capabilities.	Yes. Need two-tiered system, w/data available both via internet and locally, so if internet goes users down still have capabilities.	Yes. Need two-tiered system, w/data available both via internet and locally, so if internet goes down users still have capabilities.
Data Update Frequency	Landmarks generally annually updated, but during emergency "temporary" landmarks may be required. Temporal dimension may not be critical	Annually to semi-annually updated.	Temporal dimension is critical. Need frequent updates during emergency. Pre-arranged standards would help reduce information overload with post-disaster datasets.
Technology options			
e-delivery of data and files			
FTP	X	X	X
Email	X	X	X
HTTP Download	X	X	X
Disk	X	X	X
Rapid Deployment Kit (a disk with all base data from a authoritative repository)	X not necessarily for this phase	X not necessarily for this phase	X
Cloud Storage			
File			X
Database storage			
Catalog Database Service Portal	X	X	X
Database replication methods (ArcSDE)	X	X	X -SIMPLE DATABASE REPLICATIONS - NOT ARCSDE
Crowd sourcing (data input via social network)	X	X	X
Quality Control	X stewards	X stewards	X stewards
wms			X
WFS	X	X	

9/22/2009 Catalog Services Page 1

TECHNOLOGY INPUT

While specific technologies are not being determined in the DRAFT Functional Requirements Document, some implementation constraints do require a general understanding of the hardware and software environment and capabilities of the stakeholders.

	ESRI	Google	Oracle Spatial
State Licenses?	No enterprise	No	No
Department Licenses?	Most	Caltrans	Caltrans
Host Center Licenses?	Good	License issue	License issue
Staff Resources?	Good	Issue	Issue
Software Use Requirements	No issue	Issue	Issue
Storage & Costs			
Bandwidth & Costs			

State of CA has a DRAFT Open Source Policy that allows open source.